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TITLE: Cleaning of semiconductor process equipment chamber parts using organic solvents

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## INVENTOR-INFORMATION:

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## CLAIMS:

What is claimed is:

1. A process for cleaning semiconductor fabrication equipment parts comprising: at least partially immersing a part into an organic solvent; removing said part from said organic solvent; inspecting said part for a presence of visible contaminants; at least partially re-immersing said part in said organic solvent if said inspection indicates the presence of visible contaminants; testing said part for a presence of non-visible contaminants; and at least partially re-immersing said part if said presence of non-visible contaminants is above an acceptable impurity level.
2. A process of claim 1 further comprising removing a polymer from said part after said part is removed from said organic solvent.
3. A process of claim 2 wherein said polymer removal is achieved by scraping said polymer off with a spatula.
4. A process of claim 1 further comprising immersing said part in a dilute acid mixture to remove a presence of metallic contamination.
5. A process of claim 4 wherein said metallic contamination removal is done in a separate dilute bath.
6. A process of claim 1 wherein said presence of non-visible contaminants is comprised of at least one of organic, metallic and particulate impurities.
7. A process of claim 6 wherein an acceptable impurity level for organic impurities is about less than about 10.<sup>sup.14</sup> carbon atoms/cm.<sup>sup.2</sup>.
8. A process of claim 6 wherein an acceptable impurity level for particle impurities is about less than about 300,000 particles/cm.<sup>sup.2</sup>.

9. A process of claim 6 wherein an acceptable impurity level for metallic impurities is about less than about 10.<sup>sup.13</sup> atoms/cm.<sup>sup.2</sup>.

13. A process of claim 1 wherein said organic solvent is heated in a temperature range from above room temperature to about 100.degree. C.

11. A process of claim 1 wherein said organic solvent is heated in a temperature range from above room temperature to about 60.degree. C.

12. A process of claim 1 wherein said organic solvent is at about room temperature.

13. A process of claim 1 wherein said organic solvent is comprised of at least one of pyrrole-based, amine-based, fluoro/ether-based, hydrocarbon ether-based and glycol ether acetate based solvents.

14. An apparatus for cleaning semiconductor fabrication equipment parts comprising: a tank; an organic solvent disposed within said tank wherein said organic solvent is composed of at least one of pyrrole-based, amine-based, fluoro/ether-based, hydrocarbon ether-based and glycol ether acetate based solvents; and a heat source coupled to said tank whereby said organic solvent may be heated above room temperature.

15. An apparatus of claim 14 wherein said organic solvent is heated in a temperature range from above room temperature to about 100.degree. C.

16. An apparatus of claim 14 wherein said organic solvent is heated in a temperature range from above room temperature to about 60.degree. C.

17. A process for cleaning semiconductor fabrication equipment parts comprising: placing a part to be cleaned into a chamber; heating a liquid organic solvent to produce a vapor phase organic solvent within said chamber which contacts said part to be cleaned; purging said enclosed chamber; and removing said part from said chamber.

18. A process of claim 17 further comprising: inspecting said part for a presence of visible contaminants; and re-introducing said part to said organic solvent vapor if said inspection indicates said presence of visible contaminants.

19. A process of claim 18 further comprising: testing said part for a presence of non-visible contaminants; and re-introducing said part to said organic solvent vapor if said presence of non-visible contaminants is above an acceptable impurity level.

20. A process of claim 17 further comprising removing a polymer from said part after said part is removed from said organic solvent.

21. A process of claim 20 wherein said polymer removal is achieved by scraping said polymer off with a spatula.

22. A process of claim 17 further comprising immersing said part in a dilute acid mixture to remove a presence of metallic contamination.

23. A process of claim 22 wherein said metallic contamination removal is done in a separate dilute bath.

24. A process of claim 19 wherein said presence of non-visible contaminants is

comprised of at least one of organic, metallic and particulate impurities.

25. A process of claim 20 wherein an acceptable impurity level for organic impurities is about less than about 10.<sup>sup.14</sup> carbon atoms/cm.<sup>sup.2</sup>.

26. A process of claim 20 wherein an acceptable impurity level for particle impurities is about less than about 300,000 particles/cm.<sup>sup.2</sup>.

19. A process of claim 20 wherein an acceptable impurity level for metallic impurities is about less than about 10.<sup>sup.13</sup> atoms/cm.<sup>sup.2</sup>.

20. A process of claim 17, 18 or 19 wherein said organic solvent is heated in a temperature range from above room temperature to about 100.degree. C.

21. A process of claim 17, 18 or 19 wherein said organic solvent is heated in a temperature range from above room temperature to about 60.degree. C.

22. A process of claim 17, 18 or 19 wherein said organic solvent is at about room temperature.

23. A process of claim 17, 18 or 19 wherein said organic solvent is comprised of at least one of pyrrole-based, amine-based, fluoro/ether-based, hydrocarbon ether-based and glycol ether acetate based solvents.

24. An apparatus for cleaning semiconductor fabrication equipment parts comprising: a container defining a chamber; a grate disposed within said chamber to hold a part to be cleaned; a purge inlet in fluid communication with said chamber; an exhaust outlet in fluid communication with said container; a liquid organic solvent source; and a heat source thermally coupled to said liquid organic solvent source to create a vapor organic solvent within said chamber.

25. An apparatus of claim 24 where in said container and said grate are made out of at least one of quartz and fluoropolymers.

26. An apparatus of claim 24 wherein said liquid organic solvent is heated in a temperature range from above room temperature to about 100.degree. C.

27. An apparatus of claim 26 wherein said liquid organic solvent is heated in a temperature range from above room temperature to about 60.degree. C.

28. A process for cleaning semiconductor fabrication equipment parts comprising: providing a fluid organic solvent including at least one of pyrrole-based, amine-based, fluoro/ether-based, hydrocarbon ether-based and glycol ether acetate based solvents; and contacting said fluid organic solvent with a surface of a workpiece to be cleaned.

29. A process of claim 28 wherein said fluid organic solvent has a low water content when an anodized aluminum metal part is cleaned.

30. A process of claim 28 wherein said fluid organic solvent is a vapor phase or a liquid phase.

31. A process of claim 28 or 30 wherein said fluid organic solvent is heated in said temperature range from above room temperature to about 100.degree. C.

32. A process of claim 28 or 30 wherein said fluid organic solvent is heated in

said temperature range from above room temperature to about 60.degree. C.

33. A process of claim 28 or 30 wherein said fluid organic solvent is at about room temperature.